UNITED
NATIONS

E

Economic and Social Council

Distr.
GENERAL

E/CN.17/1995/6
6 February 1995

ORIGINAL: ENGLISH

COMMISSION ON SUSTAINABLE DEVELOPMENT
Third session
11-28 April 1995

REVIEW OF SECTORAL CLUSTERS, SECOND PHASE: LAND, DESERTIFICATION, FORESTS AND BIODIVERSITY

Promoting sustainable agriculture and rural development

Report of the Secretary-General

CONTENTS

	Paragraphs	Page
INTRODUCTION	1 - 5	3
I. GENERAL OVERVIEW	6 - 29	4
A. Current situation	6 - 8	4
B. Overall assessment of progress in different sustainable agriculture and rural development (SARD) programme areas	9 - 18	5
C. Major issues and identified gaps	19 - 29	7
II. REVIEW OF PROGRESS ACHIEVED, MAIN POLICY ISSUES AND EXPERIENCE	30 - 75	10
A. Country experiences	30 - 67	10
1. Developed countries	30 - 44	10
2. Developing countries	45 - 61	13
3. Countries in transition	62 - 67	17

95-02441 (E) 210295 220295

CONTENTS (continued)

		Paragraphs	Page
	B. Experiences of major groups	68 - 75	19
III.	MATTERS RELATED TO FINANCE AND TECHNOLOGY	76 - 103	21
	A. Finance	76 - 91	21
	1. Changing mode of financing	76 - 82	21
	2. Major issues and challenges	83 - 91	23
	B. Technology	92 - 103	25
	1. Progress on technological development and technology transfer	92 - 99	25
	2. Major issues and challenges	100 - 103	27
IV.	RECENT DEVELOPMENTS AND EXPERIENCES IN INTERNATIONAL COOPERATION	104 - 123	28
	A. Intergovernmental cooperation	104 - 119	28
	B. Cooperation within organizations of the United Nations system	120 - 121	31
	C. Organizations outside the United Nations	122 - 123	32
V.	CONCLUSIONS AND PROPOSALS FOR ACTION	124 - 134	32
	A. Conclusions: has the path towards SARD been followed?	124 - 127	32
	B. Proposals for action	128 - 134	35
	1. Overall strategy	128 - 131	35
	2. Specific proposals for action	132 - 134	36

INTRODUCTION

1. The present report focuses on progress made in the implementation of the aims set out in chapter 14 of Agenda 21, 1/ entitled "Promoting sustainable agriculture and rural development", since the United Nations Conference on Environment and Development in June 1992, and puts forth a set of recommendations for action. This report was prepared by the Food and Agriculture Organization of the United Nations (FAO), as task manager for chapter 14 of Agenda 21, in consultation with the United Nations Secretariat, in accordance with arrangements agreed to by the Inter-Agency Committee on Sustainable Development at its fourth session (see document ACC/1994/17 and Corr.1). It is the result of consultation and information exchanges between designated focal points in various United Nations organizations, and international and national non-governmental organizations. This report contains information on countries based on national information available to FAO.

2. Prior to the holding of the United Nations Conference on Environment and Development, concern about the world's ability to feed the growing population without degrading the environment and natural resource bases had received increasingly wide attention. Exploring prospects for enhanced food security and nutrition and sustainability of agricultural and rural development were at the centre of United Nations system activities. These themes were the focus of FAO's report (1987) entitled Agriculture: Toward 2000 2/ and the World Commission on Environment and Development (Brundtland) Report (1987) Our Common Future. 3/ The FAO/Netherlands Conference on Agriculture and the Environment (held at 's-Hertogenbosch (Den Bosch, the Netherlands, 15-19 April 1991) emphasized these concerns with respect to sustainable agriculture and rural development (SARD) and identified major requirements for action at national and international levels for promoting SARD. In the Den Bosch Declaration on Sustainable Agriculture and Rural Development, 4/ adopted by the Conference, the Conference called for the attainment of three essential goals: (a) food security by ensuring an appropriate and sustainable balance between self-sufficiency and self-reliance; (b) employment- and income-generation in rural areas, particularly in order to eradicate poverty; and (c) natural resource conservation and environmental protection.

3. These goals were further elaborated as the blueprint for SARD in chapter 14 of Agenda 21. That chapter elaborated these goals into 12 interlinked programme areas: (a) agricultural policy review, planning, and integrated programming in the light of the multifunctional aspect of agriculture, particularly with regard to food security and sustainable development; (b) ensuring people's participation and promoting human resource development for sustainable agriculture and rural development; (c) improving farm production and farming systems through diversification of farm and non-farm employment and infrastructural development; (d) land-resource planning, information and education for agriculture; (e) land conservation and rehabilitation; (f) water for sustainable food production and rural development; (g) conservation and sustainable utilization of plant genetic resources for food and sustainable agriculture; (h) conservation and utilization of animal genetic resources for sustainable agriculture; (i) integrated pest management and control in agriculture; (j) sustainable plant nutrition to increase food production;

(k) rural energy transition to enhance productivity; and (l) evaluation of the effects of ultraviolet (UVB) radiation on plants and animals caused by the depletion of the stratospheric ozone layer.

4. An inter-agency meeting held at FAO, Rome, in May 1993 identified the following major areas for increased cooperation and inter-agency collaboration in implementing SARD: databases including Geographical Information Systems (GIS); SARD policies; people's participation; trade, environment and agriculture; biodiversity; alternative agrochemicals; impact of climate change; and land degradation.

5. Agenda 21 has separate chapters on two of the programme areas of chapter 14: the integrated approach to the planning and management of land resources (chapter 10); and protection of the quality and supply of freshwater resources (chapter 18) on which a report was made for the second session of the Commission on Sustainable Development. Conservation of biological diversity (chapter 15), and managing fragile ecosystems: combating desertification and drought (chapter 12), are also related to some of chapter 14's programme areas. Hence reference to programme areas (d) and (f) is minimized in this report. Programme area (l), on ultraviolet radiation, now appears to be much less important for agriculture than was perceived at the time of the United Nations Conference on Environment and Development.

I. GENERAL OVERVIEW

A. Current situation

6. FAO's report Agriculture: Toward 2010 (AT 2010) (1993) 5/ shows that the rate of agricultural production growth at the global level has been about 2.3 per cent between 1970 and 1990 and thus has exceeded population growth so that per capita supplies of food have increased. However, wide regional disparities remain: the situation improved greatly in East Asia but worsened in sub-Saharan Africa. There still remain large numbers of under-nourished people in developing countries; the figure is estimated at about 780 million, or 20 per cent of their population. The relentless exploitation of the natural resource base to achieve an increased level of agricultural production has resulted in increased natural resource scarcity and environmental degradation.

7. The future food security scenario projected by AT 2010 indicates that by the year 2010, when global population will have reached about 7.3 billion, per capita food supplies will continue to increase and the incidence of undernutrition will slowly decline in most developing regions. However, parts of South Asia may still face difficulties and much of sub-Saharan Africa will probably not be better off than at present. 6/ The numbers of people suffering from chronic undernutrition will remain unacceptably high, at between 600 and 650 million. Furthermore, per capita availability of arable land is projected to nearly halve between the late 1980s and 2010, with the figure going from 0.65 to about 0.4 hectares (ha). This projection underlines the fact that pressure on agricultural resources and the environment will continue. It reinforces the fact that there is an urgent need to so promote the sustainable intensification

of agriculture as to enhance food security (while minimizing the encroachment on fragile and forested land) and protect the environment.

8. Achieving SARD is a slow-moving wide-frontier process and has to be promoted accordingly through a wide range of various social, economic and technological means. An overall assessment of the efforts carried out in developed and developing countries, and economies in transition, and by various international and local organizations, including non-governmental organizations, shows a better understanding of SARD concepts and the links between them. However, that understanding remains incomplete and there remain tensions caused by the different perspectives of SARD held by Governments, communities and people. The challenge still lies in reconciling these different views and in discovering how to make better use of improved understanding and of experience gained to achieve SARD objectives, for which a broad consensus exists.

B. Overall assessment of progress in different sustainable agriculture and rural development (SARD) programme areas

9. In the area of agricultural policy review and reform, there are efforts being made to obtain a better understanding of how to integrate environmental issues into agricultural policy and planning and to assess the links between trade and the environment, those links constituting an important consideration given the potential impulse to food and agricultural trade flows arising from the conclusion of the Uruguay Round of multilateral trade negotiations. In developed countries, in the area of agricultural policy reform, there is an increasing tendency to integrate environmental concerns into agricultural policies as well as concern regarding the impacts of trade and environmental measures on agriculture. Developing countries are beginning to address environmental problems relating to food and agriculture. Efforts include the preparation of environmental action plans and the setting up of environmental institutions with the help of the World Bank, the United Nations Environment Programme (UNEP) and other United Nations bodies. Countries in transition are in the process of restructuring their agricultural sectors and developing market mechanisms. However, although there have been significant advances in agricultural and environmental policy reform, only a few countries have developed an integrated national policy for SARD.

10. People's participation is fundamental to SARD. The issues being negotiated between Governments and farmers' organizations in developed countries increasingly involve environmental concerns. Participatory programmes are emerging. Several organizations are promoting people's participation through various programmes in developing countries. The role of non-governmental organizations has been significant in enhancing people's participation at the field or project level. Multinational lending agencies are also promoting local participation and other forms of communal organization in the management of natural resources that cannot, or should not, be privatized.

11. Efforts for improving farm production and farming systems are being carried out through various farmer-centred programmes. Non-governmental organizations have been particularly active in this area. FAO is undertaking collaborative efforts to promote SARD through analysis and relief of constraints to

sustainable agriculture at the farm level. Some countries in Asia are launching Farmer-centred Agricultural Resources Management (FARM) activities with support from United Nations organizations. Farmers and communities have demonstrated increased food production using resource-conserving technologies that minimize the use of external inputs.

12. In the area of land and water conservation and rehabilitation, there is widespread agreement that the Polluter Pays Principle should apply, although its application in agriculture raises a number of difficulties and its actual use is limited. In developing countries, the task of conserving and rehabilitating land and other natural resources is being increasingly shared by the central Government and local communities. The newly signed United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa (A/49/84/Add.2, annex, appendix II) will assist in combating dryland degradation.

13. In order to meet the objective of water for sustainable food production and rural development, national action programmes are being formulated and implemented in various countries of Asia and Africa. These action programmes aim at increasing water use efficiency, water-supply to rural areas, control of waterlogging and salinity problems, and scarce water resources management, as well as inland fisheries and aquaculture development. Inter-agency work is proceeding on how to implement the joint and integrated management of land and water resources. The necessary policy and legal instruments to achieve this may not exist and practical experience suggests that incisive government intervention may be required.

14. In the area of conservation and utilization of plant and animal genetic resources, countries are negotiating, through the intergovernmental Commission on Plant Genetic Resources (PGR), the revision of the International Undertaking on Plant Genetic Resources for Agriculture (PGRFA) in line with the Convention on Biological Diversity, 7/ including seeking consensus on matters left outstanding by the Convention: access to existing ex situ collections and realization of farmers' rights. The Global System for the Conservation and Sustainable Use of Plant Genetic Resources for Food and Sustainable Agriculture is being strengthened, including the acceleration of the development of the global information and early warning system, and networks for the conservation of PGRFA. The first stages of an assessment of the world's PGR and the Global Plan of Action on PGR are being prepared for the Fourth International Technical Conference on Plant Genetic Resources planned for 1996. A decision also has been made regarding the placing of ex situ collections of plant genetic resources in the International Agricultural Research Centres (IARC) genebanks, under the auspices of FAO. A world watch list of endangered domestic animal species has been published. Intergovernmental discussions are under way to expand the mandate of the Commission on PGR to include animal genetic resources. A global strategy on the conservation of animal genetic resources is being designed.

15. There has been considerable progress in the area of integrated pest management and related action on pesticides. Responding to consumer pressures, developed countries are taking new initiatives to reduce the use of pesticides and are taking measures to limit trade in hazardous pesticides, through adoption

of the prior informed consent (PIC) procedure. In developing countries, farmer-centred integrated pest management (IPM) projects are being carried out, particularly in Asia. There is improved collaboration among international agencies in promoting IPM and innovative financing mechanisms. Use of biopesticides and biocontrol methods is being promoted. Institutions within the Consultative Group on International Agricultural Research (CGIAR) are also taking new initiatives to promote research on IPM-related subjects.

16. In the area of sustainable management of plant nutrition to increase food production, CGIAR centres are carrying out some research activities. FAO has responded to Agenda 21 proposals by reorienting the focus of its former fertilizer programme towards an integrated, plant nutrient approach. Some countries have already made efforts to promote integrated plant nutrient systems based on a comprehensive approach involving farmers, extension services, private enterprises and farmers' organizations. Also, research is being focused to demonstrate the benefit of the combined use of mineral, biological and organic sources of plant nutrients.

17. In the area of promoting rural energy to enhance productivity, new policies and technological options are being pursued by many countries, both industrialized and developing ones. The thrust is towards enhanced energy efficiency and the promotion of renewable sources of energy, and this is setting energy and environmental links within a new context. Among the fields of renewed interest is biomass energy conversion which offers energy, environment, employment and economic benefits. However, only a few feasibility studies have been carried out on the potential exploitation of wind and solar energy in rural areas for promoting energy to enhance productivity. In a majority of cases, they have not yet proved to be competitive given the low level of real prices for fossil fuels.

18. In the area of evaluation of the effects of ultraviolet radiation on plants and animals, the impacts of such radiation on agriculture do not appear to justify action separate from that already embraced by the Montreal Protocol on Substances that Deplete the Ozone Layer. 8/ The use of methyl bromide (an ozone-depleting substance) as fumigant for soils and food products will be phased out by the year 2000.

C. Major issues and identified gaps

19. Major issues differ in each group of countries. However, the conventional external-input-intensive, trade-driven agricultural development model still dominates government, donor and funding agency policy. In many developed countries, the policy approaches to promoting SARD are being explored. Although integrated rural development policies are being implemented in some developed countries, there is often a lack of an overall coherent policy promoting SARD. The process of reforming agricultural policies, including the Common Agricultural Policy of the European Union, will have some positive effect on the use of resources for farming in more environment-friendly ways and for the production of environmental public goods, but will require specifically targeted policies and legal measures. Progress in implementing SARD in developing countries is similarly uneven, mainly because the widespread existence of

poverty is linked to environmental degradation, and the lack of a constituency of consumers with regard to food and the environment, as well as institutional weaknesses. The continued burden of external debt continues to constrain government interventions including those designed to promote SARD initiatives, while the pressing needs to service debt are claimed to underlie continued natural resource-based exports based on unsustainable practices. Countries in transition face similar challenges. Though their physical infrastructures, compared with those of developing countries, are largely in place, agrarian structures and low prices for farm products are barriers to introducing SARD policies in the short term. In all countries, the integration of SARD policies with supportive economy-wide policies still face serious challenges. Fully coherent packages of policies and their related measures, designed to meet the diverse objectives of a SARD-based strategy, are also uncommon.

20. There has been an inadequate coalition built among Governments, the donor community, development agencies and sources of foreign direct investment (FDI) to tackle the poverty-environment links. There also have been failures to address the environmental problems often associated with rapid and uncontrolled agricultural commercialization: habitat destruction and resource degradation. Owing to misconceived sectorally oriented policies, top-down approaches and the vested interests of people in power, the call for an integrated and bottom up approach has been neglected. Likewise, continuously changing development policies of international development agencies and internationally imposed policies have contributed to the marginalization of the poor and particularly women farmers.

21. The issue of poverty-environment links in the third world is perceived by some observers to be closely related also to international trade policies. They argue that Northern trade policies undermine the prospects for sustainable agriculture in developing countries in a number of ways, notably through the short-term promotion of food and agricultural exports from the South and a diversion of support to domestic policies aimed at achieving food security.

22. The agricultural sectors are being increasingly integrated into domestic and international markets. Many analyses are under way on the impact of the Uruguay Round Agreement on Agriculture which generally shows that there will be some improvement in the allocation of resources and a better trading environment for agricultural commodities. In association with domestic agricultural policy reforms, these developments will contribute to promoting SARD. However, the potential impacts of the Uruguay Round on subsistence-level farming, the existence of poor people and environmentally fragile marginal areas, which are among the major factors in unsustainable agriculture, are yet to be measured. The conclusion of the Uruguay Round has underlined the need to place world trade on an environmentally sound basis, particularly through the effecting of a better reflection of environmental costs in the prices of traded goods.

23. Intellectual property rights have evolved in certain legal and cultural contexts and as such are either totally alien to certain cultures or inaccessible to informal innovators. Under this system protection of indigenous knowledge would be difficult and might be alien to those cultures. This shortcoming can lead to abuse and must be addressed.

24. The increased effects of the use of chemical inputs, particularly pesticides, on the health of agricultural workers and on public health as well as on the environment in general, are other major areas of concern with respect to promoting SARD. The World Health Organization (WHO) estimates that between 3.5 and 5 million people a year are poisoned by pesticides (40,000 fatally), primarily in developing countries. In the case of some developing countries, these are only local problems because the overall use of such chemicals is low although increasing. More international attention is required to ensure the safe management of agricultural chemicals including the use of less harmful chemicals and alternative pest control measures. This issue also highlights the fact that a different emphasis should be placed on those chemicals that pose direct threats to human health, such as certain pesticides, in contrast with those, such as plant nutrients, that do not, in terms of regulating their use.

25. The problem of soil erosion is widespread as demonstrated by the UNEP/International Soil Reference and Information Centre (ISRIC) World Map of Human-induced Soil Degradation, but its effects tend to be more severe in the developing countries. In the developed world, correcting for soil nutrient depletion from erosion through excessive applications of mineral fertilizers may contribute to contamination of soil and water sources. Such problems are being addressed through the adoption of plant nutrient management and more comprehensive ecological farming methods. The difficulty in determining market values impedes conservation efforts by making it difficult to estimate opportunity costs and maintenance costs for rehabilitation efforts. A study undertaken by the Winand Staring Centre in the Netherlands with FAO support has shown that in sub-Saharan Africa, the generally low-level intensiveness of fertilizer use may lead to soil nutrient depletion becoming a major issue, rather than pollution.

26. There is need for greater efforts for resource conservation and rehabilitation at the field level to reduce soil degradation problems. On the management of fertilizer inputs which are necessary for effective plant nutrition in an environment-friendly manner, constraints are also imposed owing to (a) the inability of fertilizer industries, which are frequently within the public sector, to respond adequately to new orientations in the market for fertilizers; (b) the lack of reliable information on demand and supply of nitrogen, phosphate and potash; and (c) the lack of up-to-date and reliable crop/nutrient response curves, adapted to different management levels and to agronomic policy and economic conditions.

27. Progress in promoting off-farm employment - a SARD strategy component important in reducing direct pressure on land and ensuring sufficient opportunities for earning a living - has been slow in many countries mainly because of misconceived past industrialization policies that failed to integrate agriculture into the process. Continuing economic problems relating to the burden of external debt and, in most recent years, widespread recession, have also contributed to this problem. Similarly, although urbanization can act as an engine for agricultural development and hence provide an incentive for a sustainable agriculture, it has frequently been so rapid as to lead to widespread urban poverty and a deteriorating urban environment; it has depleted agriculture's supply of labour without providing a growing market for food or a flow of remittances. The fault may lie less with urbanization policies, or the

lack of them, than with development strategies that fail to provide the incentive for a productive agriculture or services to rural areas. In other countries - notably many of those of the Organisation for Economic Cooperation and Development (OECD) - there has been an increase in rural, non-agricultural employment, which has partly offset the decline within agriculture. Future rationalization of agricultural production will create a continued need for policies encouraging the development of rural off-farm employment.

28. Little progress has been made in channelling financial resources towards the promoting of SARD. The Global Environment Facility (GEF) is not directly oriented towards SARD. The relative success of IPM programmes in attracting funding underlines the importance of having a defined strategy and fundable projects. Financial constraints remain in most developing countries which are still dependent on financial support from the donor community. The potential for developing financing mechanisms for sustainable development through innovative ways of generating revenue have not yet been well explored. The challenge remains of adopting both suitable economy-wide and sectoral policies that provide an incentive for the mass of small-scale farmers to invest in conservation and sustainable use of natural resources, and sustainable agricultural practices, while expanding production.

29. While international attention has been focused on the erosion of plant genetic resources and while there have been institutional developments to facilitate remedial action, particularly through the FAO Commission on Plant Genetic Resources and the International Plant Genetics Resources Institute (IPGRI), similar progress has not been achieved in animal genetic resources. Yet the strong trend towards developing and utilizing globally an increasingly smaller number of animal genetic resources in modern agriculture poses a serious threat to the remaining resources of domesticated species. This area merits institutional development, similar to that achieved in the area of plants.

II. REVIEW OF PROGRESS ACHIEVED, MAIN POLICY ISSUES AND EXPERIENCE

A. Country experiences

1. Developed countries

(a) Overall progress review

30. For most developed countries, pressure for reforming agricultural policies has arisen through the recently concluded negotiations of the Uruguay Round of multilateral trade negotiations which started some years prior to the United Nations Conference on Environment and Development. Additional factors were rising budget costs of support policies and the aim of allowing market signals to have a greater influence on production decisions. Within this process, the OECD approach of regular "peer reviews" of member countries' agricultural policies, involving the estimation of such indicators as producer and consumer subsidy equivalents (PSE/CSE), was useful. The result has been a move towards the decoupling of farm support from production, production controls and land set-aside programmes, together with reduced levels of protection and export

subsidies that have led to reduced producer price levels. This policy change has been accompanied by a reinforcement of integrated rural policies directed to all sectors of the rural economy. In some countries consumer pressure is also mounting in support of organic food production. It may be discerned that since the United Nations Conference on Environment and Development, there have been more moves towards making the promotion of more efficient agricultural markets, both domestic and international, compatible with the goals of conserving natural resources and protecting the environment.

31. Among Western European countries, Germany recently emphasized ecologically sustainable agricultural production and the United Kingdom of Great Britain and Northern Ireland submitted a plan to the European Union for implementing agri-environmental regulation. The United Kingdom plan includes measures for expanding environment- and nitrate-sensitive areas. The Netherlands rearranged its institutional structure at the ministerial level in order to give specific attention to the management of natural resources. Austria has reoriented its economic policies under the rubric of "eco-social-market policies" in order to maintain services provided by farmers in disadvantaged areas and to improve environmental performance in abating natural hazards and erosion, and promoting diversified land use and soil quality. Likewise, Norway has strengthened environmental measures. Sweden introduced an agricultural reform bill in 1992 which set forth environmental goals to safeguard landscapes, to preserve the natural and cultural values of the environment and to minimize the negative impacts of agricultural chemicals. In Switzerland, the federal authorities introduced economic incentives in 1993 to promote ecological farming.

32. The Japanese Government introduced a new agricultural policy in June 1992 in order to promote environmentally sound agriculture.

33. In the area of soil and land conservation, OECD produced a report on "Public Policies for the Protection of Soil Resources" in 1994 that presented the findings of a two-year project on sustainable soil and land management. It addressed soil erosion problems induced by human activities, soil pollution by chemicals, soil salinization, afforestation and the management of semi-arid lands.

34. In the United States of America, recent legislation, building on the Sustainable Agriculture Adjustment Act of 1989, is designed to enable farmers to adopt resource conservation techniques. Efforts are intensifying to incorporate environmental issues more fully into the 1995 farm bill including a modelling of the environmental impacts of its policy options.

35. Australia has expanded its National Landcare Programme to integrate the efforts of government (national and state), individuals and communities in responding to land degradation. A feature of this Programme has been its participatory nature with communities forming groups of farmers that plan and implement their own land use and conservation projects.

36. In the area of people's participation, agricultural organizations are being considered partners by the governments of the Western European countries in the elaboration and implementation of agricultural policies, including direct income support and production control measures. These have become closely associated

with environmental measures. Implementation of agro-environmental programmes is largely decentralized at the community level and based on the voluntary and contractual participation of farmers. These programmes also focus on the diversification of land use and off-farm activities and include organic farming and non-food uses of the land. For example, in Norway, the Farmers' Union has adopted a policy emphasizing the sound stewardship of land and other natural resources.

37. As regards the use of pesticides, various measures, such as national pesticide reduction plans where reduction of 50 per cent within five to ten years is being planned and achieved, control of pesticide residues, provision of training in the use of pesticides and regular control of pesticide application equipment are being implemented. Other measures support the purchase of more efficient application equipment, introducing specific rules on selling phytosanitary products, and the research, development and wider use of alternatives to chemical pest control, including biological control agents and pest-resistant varieties. However, recent reductions achieved in the volume of pesticides used may be due as much to the increasing activity of the ingredients as to genuine reductions in use.

38. In the United States, all previously approved pesticides are being re-evaluated and a number of them have been taken off the market or have had their acceptable residue levels reduced.

39. Developed countries are also taking a more active role in implementing management-related activities in PGRFA. Most of these have started the process of preparing activities which will become part of Global Plan of Action. Progress in developing strategies for <u>in situ</u> conservation has been relatively slow, however.

40. In the area of rural energy, some developed countries have introduced a series of production, price and taxation policies to promote the "decentralized" production of power with renewable energies (wind, solar, biomass). This has opened up possibilities for new energy markets of potential benefit to rural areas that are becoming energy producers (namely those having, for example, sugar, rice and groundnut mills; large livestock farms; wind "farms"; and photovoltaic (PV) installations).

(b) <u>Major issues and challenges</u>

41. Some developed country Governments have expressed difficulty in applying the goals of chapter 14's programme areas to their particular situations. This may reflect the fact that most have yet to begin strategic planning for implementing a SARD strategy. There is still a lack of fully coherent packages of policy measures combining those affecting farmers' decisions on farm practices with those on training, extension services, provision of credit and so on that are needed to move towards SARD. There is also a need for greater involvement of local communities and non-governmental organizations in formulating and implementing SARD programmes.

42. In past decades, developed countries have achieved considerable success in food and agriculture but in a rather narrow range of objectives of expanding

output and enabling farm incomes to match those in non-agricultural sectors. However, this has been achieved at the cost of much environmental damage. The challenge, therefore, is to balance farm production/income goals with environmental protection in essentially market-driven economic settings.

43. There has been a high degree of reliance on market forces in promoting agricultural production. However, can market forces (a) set an agricultural research agenda that though increasingly dominated by private commercial interests is oriented towards developing sustainable technologies, and (b) exert demand pressure for organic products so as to promote a significant shift towards more environment-friendly production practices?

44. There is a need for sufficient political support for the more visible "decoupled" income transfers in order to compensate for output losses arising from more environment-friendly practices and for land set-aside programmes.

2. Developing countries

(a) Overall progress review

45. The government priority in the majority of developing countries is to increase food production to meet the demand of growing populations. In line with this approach to food security, pricing policies for food items and farm inputs were designed to provide incentives to farmers as well as to keep food prices within the reach of consumers, particularly urban ones. In addition, programmes were established, often with the assistance of external donors, in research, extension and training, and marketing and distribution of agricultural products, to promote the use of modern technologies.

46. Review of economy-wide and sectoral policies in line with SARD has yet to be carried out in most of these countries. Domestic pressure for quality food products is rarely present although external pressures are being exerted, through international trade. A few developing countries have prepared National Environmental Action Plans (NEAPs) with technical support from the World Bank, UNEP and the United Nations Development Programme (UNDP). NEAPs focus on the resource base but also include such topics as integrated management of soil, water and plant nutrition, training on integrated pest management, monitoring and training for sustainable agriculture and agro-environmental protection activities at the field level. Though these NEAPs are in most cases lists of priority areas and do not necessarily integrate environmental policies into economic planning, they have contributed to a better understanding of the needs for addressing environmental problems at the national level.

47. At the sectoral level, some countries have started to address the matter of policies for increasing the efficient use of land and water resources mainly on the side of demand. Demand management policies for water include pricing of the resource, increasing on-farm system efficiency of water use, and developing water markets where possible.

48. The Farming Systems Development (FSD) approach has been accepted and widely applied in several developing countries. In Eastern and Southern Africa, for

example, FSD features prominently now in Kenya, the United Republic of Tanzania, Zambia and Botswana, and this has been achieved through FSD-awareness programmes for decision makers, human resources development programmes, and networking. In the Sudano-Sahelian region of West Africa (the Niger, Benin, Burkina Faso, Senegal), a new generation of sustainable resources management projects are increasingly using a comprehensive FSD approach. In Benin, the RAMR (Recherche agronomique en milieu réel) project aims to improve the technological transfer process, and PEMR (Poursuite des études en milieu Réel) advocates improving farmers' participation in rural development. In Latin America, more comprehensive systems are being launched to promote FSD, particularly in marginal areas in Peru, Ecuador and Brazil, with the aim of promoting participatory rural development.

49. In Asia, the FARM programme for sustainable agriculture has been launched to support the implementation of Agenda 21 in China, India, Indonesia, Nepal, the Philippines, Sri Lanka, Thailand and Viet Nam. The programme is targeted at resource-poor communities and farm households, with an overall objective of improved conservation, management and utilization of natural resources in rain-fed lowlands and uplands.

50. The UNDP-initiated programme on Sustainable Agriculture Networking and Extension (SANE) aims to enhance capacity-building and human resources development in the area of sustainable agriculture through agro-ecological training, participatory research, policy advocacy and information networking among non-governmental organizations and other national/international organizations in Asia, Africa and Latin America.

51. At the local level, the Group Farming Initiative of the Kerala state Government in India presents a good example of how coordinated action can have a significant impact on farming practice. Local communities comprising all rice farmers were established for group activities, such as water management and labour mobilization.

52. In the area of agricultural chemicals, pesticide registration information in developing countries of Asia has been recently compiled. Indonesia and the Philippines (both in rice) and Brazil (in soy beans) have already implemented IPM programmes. FAO is supporting IPM programmes in rice, vegetables and citrus fruits in South-East Asia and start-up studies on sorghum and millet in Africa. Together, these programmes are training many thousands of farmers and have saved many millions of dollars in costs of pesticides: pesticide use has been halved in Indonesia since 1987, largely because of the IPM rice programme, coupled with a phasing-out of pesticide subsidies.

53. In China as part of its national Agenda 21, agricultural policy is encouraging farmers to grow green manure in rice fields: green manures and plant residues are now used on two thirds of its rice area. Chinese Ecological Agriculture (CEA) is an approach to agricultural management guided by the principles of ecology and economics. It combines both indigenous and modern technologies with maximum recycling of wastes generated in the production and consumption processes. Likewise, use of green manure and cover crops in Central America and Brazil has transformed farming practices in recent years. Cuba has introduced an "Alternative Agricultural Model" which focuses on technologies

that substitute for external inputs, such as IPM (to replace pesticides). Namibia has produced a Green Plan that strongly advocates the preparation of a national action plan to implement sustainable development.

54. As regards land conservation and rehabilitation, efforts made so far by international, national and local agencies in developing countries are - compared with the magnitude of this problem - inadequate. It is becoming clear that conservation and rehabilitation activities can be carried out at a reasonable price and over large areas only through the activities of land users themselves, either as individuals or in groups. This is resulting in a move away from Governments' trying to carry out large-scale soil conservation projects themselves. A recent longitudinal study, funded by the World Bank, the United Kingdom Overseas Development Administration and the Rockefeller Foundation, of the Machakos District in Kenya, has improved understanding of this process. During a period of 60 years, the district's population increased fivefold, and average output per unit of land rose almost tenfold, while environmental conditions measurably improved largely through the autonomous undertaking of erosion control measures by the farmers themselves. In some countries, such as the Niger and Burkina Faso, efforts are being made to develop soil and water conservation practices, based on traditional technologies, which do not require the use of heavy equipment or expensive inputs.

55. SARD is also closely related to the matter of the security of land tenure. Even given the fact that insecure tenant farmers and sharecroppers may have little incentive to invest in measures designed to enhance land productivity in the long term, there has been little apparent progress in addressing this problem. The Gambia has begun to study the impact of land tenure on natural resources management and Zimbabwe has established a high-level committee to formulate land tenure strategies.

56. Progress on conservation and sustainable utilization of PGRFA in developing countries is mixed. A few countries - Brazil, China and India - have established national programmes and mechanisms for conserving and utilizing PGRFA. Since the United Nations Conference on Environment and Development these national programmes have begun to implement the activities listed in Agenda 21. In contrast, a number of least developed countries and many island countries have no specific programmes on PGRFA. Some have national facilities but often these are underfinanced and understaffed.

57. Several countries have created and consolidated cooperation networks on the exchange, management and conservation of plant genetic resources, closely linked to the use of new technologies. Most of the efforts have been made in plant rather than in animal or micro-organism genetic resources, however. Scientific guidelines and manuals are now available for defining scientific and operational concepts for implementing biosafety systems.

58. A sustainable rural energy supply and transition to enhanced agricultural productivity remain a major issue in developing countries. Although some progress has been made in the utilization of some renewable forms of energy (wind, solar, biomass), low prices, and especially the subsidies provided to fossil fuels, continue to hamper their application.

(b) Major issues and challenges

59. Most developing countries are under pressure from numerous sources to review agricultural policies, plans and programmes, both economy-wide and sectoral ones, with respect to their implications for the sustainability of economic development and the achieving of food security. Those sources of pressure include the conditionalities imposed by lending institutions, as part of stabilization and structural adjustment programmes, as well as the follow-up to the United Nations Conference on Environment and Development, the seeking of more effective government input into the provision of food security and more rapid economic growth. Trade-offs between economic growth and environmental protection, or between reducing poverty and conserving natural resources, if stated in an overly simple manner, can pose serious policy and political dilemmas for developing countries. They typically possess limited institutional and human resource capacity to assess the implications for sustainable agricultural and rural development of ongoing developmental plans. Such countries find their limited capacities further extended by multiple, overlapping and uncoordinated requests for environmental and sustainable development plans and their analyses. Experience shows that response to external demands often result in top-down, non-participatory actions with too much emphasis on the plan as a document and too little on its entailing a process that will result in changed attitudes towards the shifting of agricultural and rural development onto a sustainable path.

60. Insufficient capacity to review economy-wide and sectoral policies, due to data- and institution-related limitations as well as the lack of political commitment, characterizes many developing countries and has limited progress in achieving SARD. The links among the incidence of poverty, the dynamics of population growth and migration and environmental degradation are not well understood. Three types of conceptual and empirical knowledge are required about agricultural, environmental and economic systems. These involve:

(a) A better understanding of biophysical relationships that allow quantification of, for example, the effect on yields of a given level of soil erosion or changes in climate, or the effects on the natural resource base of particular agricultural practices. Such quantifiable cause-and-effect relationships are necessary in order to calculate costs and benefits of alternative actions;

(b) The establishment of appropriate (efficiency or social) prices or values for environmental goods and services produced and consumed and for natural resources stocks. For some of these, reasonably efficient and competitive markets provide usable prices. However, for many environmental goods and services either markets do not exist or existing markets are imperfect (so that market prices either are not available or do not reflect true social values). There is thus a need to develop markets, to remove any impediments to their development, and to so price resources and production as to reflect those social values, thereby internalizing externalities. However, where markets do not exist, there arises the problem of the valuation of environmental benefits, as a basis for any policy intervention and evaluation. This also underlines the issue of intellectual property rights as they relate to the rights of farmers with respect to genetic resources;

(c) In areas where market-based instruments cannot provide economic incentives, such as that of subsistence-level farming, there is a need to identify resource use and management alternatives to relieve the pressure on marginal areas. Creation of physical infrastructures will gradually help to introduce market-based policies, but there is a danger of further resource depletion and environmental degradation before the introduction of such mechanisms is fully achieved. In such areas, identification of local needs, clear definition of property rights, development of indigenous technologies and enhancing of participation of the local people are necessary. These efforts are being retarded mainly by widespread ignorance of local people's knowledge of these issues.

61. Another major gap is the current weak institutional status in a variety of areas. Firstly, current institutional arrangements for promoting sustainable agriculture are largely project-based. This means that progress has been weak in the overall policy area, and it has also been weak in the building of viable institutions that can provide continuity and adequate support to the efforts made. In addition, there is often a lack of a strong political commitment to making the transition to sustainable agriculture and rural development, so as to safeguard the environment and eradicate poverty. In most countries the existing bureaucratic structure is inefficient or not well structured and incapable of tackling deep-seated social problems relating to more equitable access to land and other assets and the status of women. Finally, in the area of food trade, non-tariff barriers are becoming increasingly important, reflecting rising health and environmental concerns in developed country markets. Responding to legislation such as the prior informed consent (PIC) procedure and the Codex Alimentarius places additional demands on developing country institutions in meeting the requirements for setting and monitoring food-quality and packaging standards.

3. Countries in transition

(a) Overall progress review

62. The countries with economies in transition are exposed to the same pressures and constraints as both developed and developing countries. In particular, they currently confront major industrial or "brown" pollution problems, together with the effects of radical changes in economic systems that have completely altered input-output price relationships, including those for agriculture. Environmental factors related to agriculture are largely being overshadowed by basic problems such as land reform, farm restructuring, input supply, improvement of production and productivity, and pricing. There are still geographical areas where the overriding environmental issue is the radionuclide contamination caused by the Chernobyl accident of 1986. Nevertheless, these countries are moving towards a process of agricultural reform, including the adoption of measures directly related to rational use of natural resources and environmental issues and the protection of water and soils. Policies aimed at taking marginal lands out of production are being introduced. Another consideration is the sharp reduction for economic reasons in the use of fertilizers, plant protection chemicals and energy.

63. In the Czech Republic, the policy objective is to combine sufficient yields with environmental protection. In order to reduce surpluses together with the intensive use of land, measures have been taken to withdraw land from cultivation and turn it into meadow or woodland. Poland has prepared a programme entitled "Pro-ecological Orientation in Agricultural Policy in the Twentieth and Twenty-first Centuries". In the Russian Federation, as a result of agrarian reform, 60 per cent of the cropland has been brought into new forms of agricultural enterprises. The Russian Government also adopted a decision on the functioning of the agro-industrial complex of the Russian Federation for 1994 to keep the economic incentives given to producers in 1993. In Romania, the modernization and restructuring of the whole agro-food sector is taking place with the stated aim of strengthening food security. Though these measures do not directly contribute to environmental improvements, the move towards privatization should establish an economic environment favourable to the introducing of market-based measures.

64. As regards chemical fertilizers and pesticides, the rate of use has decreased in countries such as Bulgaria in the last five years owing to agricultural reforms, discontinuation of state subsidies, increase in costs, and training and extension programmes. In Hungary, various measures have also been taken concerning the use of nitrates. As for pesticides, a widespread network for the monitoring of crops allows residues and their impact on the environment to be controlled. Measures are also being taken to regulate the use of nitrogenous fertilizers.

(b) Major issues and challenges

65. In most of these countries, there did not exist a policy framework designed to influence producer, consumer and investment behaviour through the modifying of price signals. Thus, it is a case of needing not to review, analyse and modify existing policies but rather to design and implement a new policy framework. This has the advantage of offering an opportunity to learn from past mistakes connected with the policies of other (including developed) countries. However, there are few people with knowledge of and experience with market institutions, and the institutions through which policies can be administered are few in number and weak. The existence of only poorly organized markets with their inexperienced participants makes response behaviour less predictable than it would be in established markets. The provision of adequate education and training is a challenge, together with support to the formation of farmer groups and other non-governmental organizations to promote participatory decision-making for coherent policies aiming at the well-being of the rural population. It is likely that this will lead to major employment problems in rural areas which will require the establishment of alternative sources of income.

66. One of the serious problems encountered in the transition process which has critical implications for sustainability of agriculture production and use of land resources has been that concerning the processes of privatization and decollectivization of state and collective farms. Political pressure for rapid action has often resulted in distribution of land before legal instruments and institutions were in place to provide clear and transferable tenure rights. Land grabbing, together with excessive fragmentation, has prompted Governments to choose cautious approaches before a well-functioning land market is in place

and individual rights and responsibilities are established. It is also difficult to design policy instruments to internalize environmental externalities associated with land use practices when tenure rights and responsibilities are not well established.

67. There has also been an excess of often conflicting policy advice from the various bilateral and multilateral assistance agencies. The already overtaxed capacity for policy analysis is being called upon to evaluate the "sustainability" of the policy advice offered by those who are looked to for help.

B. Experiences of major groups

68. In preparing this report, the task manager made an effort to reach out to major groups, in particular non-governmental organizations and farmers' and women's organizations. An invitation to contribute views and experience was sent out in July 1994 to over 30 international non-governmental organizations and regional and subregional non-governmental organization networks active in the area of SARD, more than half of them based in the developing world. The fact that individual replies were received from nine, including two from the South, demonstrates the difficulty of channelling to an international level the rich and diverse experience of organizations that have priority calls on their limited resources and cannot easily apply them to reporting. The material presented in this subsection thus presents only a partial view of major group experience.

69. It should be emphasized that there is no single non-governmental organization, much less a major group, view of SARD and of what its implementation entails. Many non-governmental organizations have, however, expressed their feeling that the perspective of chapter 14 of Agenda 21 is overly technological and insufficiently critical of the current development model. As these non-governmental organizations see it, chapter 14 fails to address the issue of the overall system driving unsustainability. The fundamental characteristics of the global food system that are incompatible with the objectives of SARD are, they feel, the dominant development model of unlimited economic growth, short-term profit and disregard for social and environmental "externalities"; underregulated international markets and transnational corporations, globally mobile capital, and a globalized food and agriculture system based on world prices well below the costs of production; structural adjustment programmes; indebtedness and debt repayment strategies; and systems of national accounts that fail to value a healthy environment, a productive resource base, preventive health care, and non-wage-type but essential social and reproductive work and stewardship of resources. One form of non-governmental organization follow-up to the Rio de Janeiro Conference has thus been a continuing constructive critique of SARD concepts, emphasizing such elements as democracy, participation, equitable access to resources, local solutions, cultural values, social justice and equity, and ecological agricultural systems often adapted from traditional methods. Concerns like these, expressed in the NGO Alternative Treaties on Sustainable Agriculture and Food Security adopted in Rio de Janeiro in 1992, have been reiterated in subsequent international non-governmental organization meetings such as the

"Bringing Rio Home" conference held in Mulheim, Germany, in September 1993, the "Down to Earth: Between the Summits" meeting held in Copenhagen in December 1993; and the International Week on Sustainable Agriculture and Food Security, which took place in Washington, D.C., in October 1994.

70. Non-governmental organizations have undoubtedly increased the intensity and effectiveness of their lobbying on SARD-related issues at the international level since the United Nations Conference on Environment and Development. Non-governmental organization-organized discussions and preparatory work are helping to ensure that SARD does not slip off the agenda of international conferences like the International Conference on Population and Development, the World Summit for Social Development and the Fourth World Conference on Women. At the same time, many non-governmental organizations note and are concerned that factors such as distance, limited human and financial resources, and unequal access to information are tending to distinguish between those non-governmental organizations that are closely following international processes and those, particularly in the developing world, that are not.

71. More generally, non-governmental organizations note that their involvement is now being solicited by a steadily increasing quantity of international actors and forums to an extent that is well beyond their capacity to participate in a substantive way. At the International Week on Sustainable Agriculture and Food Security, held in Washington, D.C., in October 1994, participants identified a need that they felt to think and act strategically, while planning for the long term and carefully selecting where to invest their energies, through, for example, taking preventive action to promote the establishment of frameworks for new developments like biotechnology; monitoring the impact of the Uruguay Round on agriculture in order to be in a strong position for the review process that will take place in four years time; maintaining links between community-level activism and policy-level advocacy at national and international levels; and maximizing research and information capacities in order to be able to demonstrate the viability of alternative approaches.

72. A number of international non-governmental organizations have reported post-United Nations Conference on Environment and Development activity to propagate SARD within their organizations. The International Federation of Agricultural Producers (IFAP) has adopted SARD policies at its World Assembly and is proposing action to strengthen farmers' organizations and links among farmers, researchers and extension services. The International Federation of Organic Agricultural Movements (IFOAM) is developing and promoting an international organic standard system aimed at maintaining the productive capacity of the soil. The Pesticides Action Network (PAN) is undertaking advocacy and fieldwork aimed at reducing dependence on chemical pesticides by promoting sustainable agriculture. The World Sustainable Agricultural Association (WSAA) has organized conferences on sustainable agriculture in Asia and South America. At the same time, less formal networking arrangements, as an effective and flexible way of exchanging experience across national and regional frontiers, have multiplied in the non-governmental organization world.

73. Non-governmental organization contributions to the task manager's report provide far less information on activity at national/local levels than at international ones. A report from the United Kingdom does indicate that a

pro-SARD movement is taking shape there and in other European countries. Non-governmental organizations and other interested parties are joining together to offer advice and support to Governments in developing cohesive policies for SARD at national and regional levels. Particular attention is being given to involving European farmers in the process.

74. Throughout the developing world, as non-governmental organization reports emphasize, indigenous organizations and local community groups have played a significant role in managing and developing natural resources. Examples are peoples' irrigation systems in northern Thailand, farmer-managed irrigation systems in Nepal and the waru-waru land management system in Peru, to name a few. However, such traditional systems are gradually being eroded in many parts of the developing world, as indigenous people are displaced and their agriculture strategies endangered. Non-governmental organizations play an important role in defending and rehabilitating those systems. The same holds true, as non-governmental organizations point out, for agricultural practices. Many of the practices now being pursued in the name of sustainability were traditional agricultural arts, pioneered and field-tested by peasant farmers. Among these are crop rotation, spatial diversification through cultivated crops and wild species on farms, biological pest control, soil-building through composting and green manuring, cover-cropping and conserving open-pollinated seed varieties.

75. There is an increasing wealth of non-governmental organization and other major group experience in Africa, Asia and Latin America, as organizations go beyond specific initiatives in limited areas to develop more comprehensive strategies for promoting peasant-based SARD. This wealth has not been captured in the present Commission on Sustainable Development reporting process, in spite of the fact that non-governmental organizations are attaching importance to more systematic analysis and exchange of experience.

III. MATTERS RELATED TO FINANCE AND TECHNOLOGY

A. Finance

1. Changing mode of financing

76. Agenda 21 estimated that the average annual cost (1993-2000) of implementing SARD was about US$ 31.8 billion of which about US$ 5.075 billion was to come from the international community as grant or concessional loans. How much of this total estimated funding requirement has been or will be achieved is a question this report cannot answer.

77. Financing efforts to promote SARD is a key issue, especially in developing countries. Various international, multinational and national agencies have been, and continue to be, the major source of finance for projects with environmental impact in those countries. It is especially the regional development banks, the International Fund for Agricultural Development (IFAD), UNDP and the World Bank that have been the main lending organizations for technical assistance and loans for agricultural and rural development projects in developing countries and economies in transition. Hence their policies on

their appraisal of project proposals in the light of SARD objectives are crucial. As an example, IFAD has sharpened its focus on the financing of sustainable agriculture projects that can serve as replicable models for rural poverty alleviation. It has also begun an accelerated institutional learning programme on natural resource management for rural poverty alleviation, including proactive environmental assessments of 23 agricultural development projects. Since August 1994, IFAD has adopted formal procedures for environmental assessment to apply to all pipeline projects.

78. The Asian Development Bank has made a fundamental commitment to sustainable agricultural development (SAD). Post-United Nations Conference on Environment and Development activities include efforts to incorporate the United Nations Conference on Environment and Development agenda in the Bank's strategic planning process and the formulation of a strategic focus and agenda on SAD. It seeks to foster development of sustainable agricultural production systems and to ensure that the following elements of sustainability are incorporated in the formulation and implementation of Bank-financed projects: increased and stabilized productivity; rational use of natural resources; enhancement of the quality of life and the environment; and intergenerational equity.

79. Between 1992 and 1994, the Asian Development Bank approved a number of SARD-related projects which included (a) tropical crops development, and soil conservation and management in China, (b) tree crop development, upland farmer development, and sustainable agricultural projects in Indonesia, (c) watershed development in Bhutan, (d) environmental rehabilitation in Thailand, (e) tea development in Nepal, and (f) flood damage restoration in Pakistan. It has also assisted in institutional strengthening and environmental impact assessment activities in its member countries. Implementation of its SAD strategy is being supported by a number of parallel initiatives. These include rationalization of the policy environment in the Bank to promote renewable production systems; a continued increase in productivity; nutritional security activity; and transfer of technology, particularly biotechnology.

80. The World Bank is undertaking efforts to make the links among environment, agricultural development and poverty explicit in its project and programme lending. The main programme areas include natural resource monitoring and assessment studies; improvement of irrigation technology and water management to reduce pollution; arresting of salinity and waterlogging; and development and dissemination of improved farming practices.

81. The World Bank is currently financing 49 projects (in 35 countries) that serve directly to improve natural resources management. Funding for biotechnology is generally a component of these projects, with more loans for agricultural biotechnology. Countries like Brazil, India, China, Indonesia, Mexico and Turkey have been the biggest clients in drawing loans for environmental improvement. Likewise, new lending was also approved for 13 projects addressing rural environmental problems - so-called "green" projects involving new environmental borrowers such as Bhutan, Colombia, the Lao People's Democratic Republic and Uruguay as well as older clients such as China, India, Indonesia, Pakistan, Paraguay, Poland and Tunisia. Also, loans were approved for strengthening environmental institutions in the Gambia, the Republic of Korea and Morocco. Financial support was given to several sub-Saharan African

countries, to prepare NEAPs. However, most investments were directed towards forest protection and urban environmental improvements. In the area of poverty reduction and environmental management, 66 operations were approved by the World Bank during 1993-1994 of which 10 were specifically directed at natural resources management.

82. The World Bank has also promoted innovative financing mechanisms for the restoration of degraded lands and agricultural promotion projects. These projects seek to increase agricultural production and rural incomes by encouraging farmers at the micro-catchment level to adopt sustainable forms of land management and soil and water conservation.

2. Major issues and challenges

83. Though some progress towards changing the mode of financing mechanisms can be seen, the existing level of poverty and growing environmental problems raise serious questions about the sufficiency and the mode of financing to promote SARD in developing countries. In most of these, the potential cost of natural resources depletion and environmental degradation is very high compared with defensive expenditures or the investment made for environmental improvement.

84. There is a need to identify priorities, and mobilize additional financial resources, mainly at the household or farmer's field level. Identification of priority areas at the local, regional and national levels in each country and a search for alternative sources of funding are required to make the transition towards sustainable development. In some cases, however, rather than look for additional financing, it may only be necessary to avoid unsustainable practices. This may involve revoking past policies that rewarded speculative land clearance or subsidized chemical inputs. Conventional financing mechanisms aimed at promoting agricultural production, extension services and research priorities would have to be reoriented and restructured (rather than such sources being alone looked to for increased funding).

85. Not only should the alternative financing mechanisms to be developed be non-distortionary, but they should also mitigate market failures, internalize externalities and correct incentive structures. Within the changing context of sustainable development, developmental efforts should be able to pay its full costs, that is, the environmental and social costs; for this reason resources have to be priced at or equal to the marginal value or scarcity rent and incorporated into development-related decision-making.

86. Ex ante reduction in the use of potentially damaging inputs and waste generation will, wherever applicable, be a more practical way of minimizing their effects than ex post diversion of large amounts of resources. Each country has to work out the physical links between ecosystem resource use and productivity under different conditions for different products. The identification of these links will help in identifying additional physical and human resource and investment needs.

87. Efforts should then be made to prepare national plans on financing for sustainable development. In theory, considerable opportunity exists to use

public finance and fiscal policy to encourage a more sustainable use of natural resources. However, modifying the behaviour of the private users of resources is hampered in practice by the same valuation problem mentioned above. Pending further progress on valuing environmental goods and services, policies may have to be set using intuitive rather than fully rational criteria. Moreover, irrespective of quantification, the longer-term nature of environmental benefits puts them at a political disadvantage relative to pressing and shorter-term concerns when financing priorities are set.

88. Some progress on altering fiscal policies as part of structural adjustment programmes so as to discourage unsustainable resource use has been made. Funding under GEF has provided some financial means for Governments to subsidize activities having external, intangible or very-long-term benefits but, as already stated, GEF is not directly oriented towards SARD. Nevertheless, IFAD has established a framework agreement on GEF collaboration, whereby the GEF portfolio may be enriched with projects that address global environmental concerns through community-based resource management-related agricultural projects.

89. Since it is unrealistic to expect large increases in government or multilateral finance for environmental conservation and SARD, the need is to (a) refine the methodologies and means to strengthen the potentially powerful economic arguments for larger allocations in favour of sustainable agriculture within existing budgets; and (b) to assist Governments in framing policies that maximize the potential leverage on private behaviour and investment of available public finance, that is, to mobilize private sector investment in sustainable agricultural practices and particularly the labour inputs of small-scale farmers. FAO and the World Bank, the International Monetary Fund (IMF) and other multinational financing organizations have major roles to play in achieving these goals.

90. Several financing mechanisms are feasible for SARD. First, for making a transition to sustainable development, there is a need to reduce progressively or remove subsidies on chemical fertilizers, pesticides, irrigation water and electric power, and design economic incentives to avoid excessive input use. Second, self-financing mechanisms at the local level should be explored by guaranteeing farmers' rights. For example, the farmer's willingness to pay for the use of irrigation water and upper watershed protection could be captured. Likewise, the farmer's willingness to pay for the use of chemical fertilizer and pesticides (in areas where there is potential for groundwater and surface-water pollution) can be captured and used for developing organic farming methods. When farmers want either to convert to organic farming because conventional inputs are too expensive, or to have access to markets for organic foods, it is important to support the development of organic farming methods, adapted to the region concerned and to analyse the economics of conversion. Investment in infrastructural development projects can change the value of rural property and some taxes on these added values can be imposed and directed for off-farm income-generating activities. Likewise, private financing in promoting organic fertilizer and biotechnologies can be initiated through joint efforts of local universities, private entrepreneurs and farmers.

91. Another way of generating revenue for environmental protection is through environmental tax reforms. This means shifting from conventional systems of taxing "goods" to taxing "bads". Examples are reducing land taxes and increasing water and water pollution taxes. Possibilities with respect to making such a shift in conventional tax systems and looking for the other mechanisms outlined above should be explored by each country, and areas where international cooperation and financing are needed should be worked out.

B. Technology

1. Progress on technological development and technology transfer

92. Case-studies conducted by the United Nations Conference on Trade and Development (UNCTAD), the World Bank and others, including non-governmental organizations, demonstrate that sustainable production techniques exist and that farmers in both developed and developing countries are showing an increasing interest in their adoption. Farmers respond positively when the necessary incentives are provided and when extension services are available and the macroeconomic framework as well as international trade opportunities is favourable.

93. Increasing consumer concerns regarding the quality of food and the environment, and hence the demand for "organically" produced products (both foods and agricultural raw materials), has an important potential for improving environmental standards and promoting the technologies to meet these standards.

94. FAO, in cooperation with other international organizations, national Governments and non-governmental organizations, has promoted, introduced and implemented various environment-friendly technologies in the past. For soil conservation, such technologies include cover crops, wind-breaks, timing of cultivation according to weather conditions, contour cropping, selective and more shallow ploughing, minimum- or no-tillage agriculture, and maintenance of organic-matter content through organic manure or composting of green-manure crops and crop residues. Bioenergy conversion of agricultural and livestock wastes also offers alternatives for energy and fertilizer production. Together with the International Atomic Energy Agency (IAEA), FAO is exploring possibilities for employing the sterile-insect technique to eradicate the Mediterranean fruit fly in the Mediterranean basin, a technique that led to the recent eradication of the screwworm in North Africa.

95. Another track with respect to insuring sustainable agriculture is to use environment-friendly "conventional" pest and weed control technologies, an approach already adopted by several developed countries such as Denmark and Sweden. The wider introduction of these technologies in developing countries has to be based on their local needs, knowledge and agro-ecological conditions. Developing countries also have an urgent need to augment their capabilities for the production of less hazardous pesticides, while ensuring conservation of the environment through adequate treatment of effluent. Promotion of environment- and user-friendly, IPM-compatible pesticides and their formulations, including botanical pesticides such as that derived from the neem tree in Asia and microbial pesticides based on the bacterium Bacillus thuringiensis, is another

approach. Regional National Pesticides Production in Asia and the Pacific (RENPAP) under the UNDP/FAO/UNIDO FARM project is aimed at creating a self-sustaining functional Regional Network, catering to the information, individual consultancy and training needs of its 15 member countries. The Regional Network will support the production of botanical pesticides, the safe production of pesticides and effective waste disposal management in pesticide production facilities.

96. There is a search for alternatives to large-scale chemical control methods, combined with cultural weed controls, breeding programmes directed towards crop selection for tolerance of weeds and plant breeding for insect and other pest resistance. Application of the International Code of Conduct on the Distribution and Use of Pesticides 9/ as well as PIC is exerting pressure on pesticide users to adopt less toxic products as well as IPM technologies.

97. The World Bank has set out to identify the existing technology gap and address the issue for the purpose of increasing the productivity of existing resources in order to minimize the pressure on marginal areas. Examples of efforts in this area are the co-managing of a project researching exploitation of local sources of rock phosphate in sub-Saharan Africa; the promoting of innovative land management projects such as the expansion of technologies for conservation tillage in tropical environments throughout Latin America and into Africa; the broad dissemination of research into and field trials of various vegetative barriers for land conservation; and the developing of an agenda on Soil-Water-Nutrients management (SWNM) in collaboration with CGIAR centres and national research systems. Other components of the project on innovative approaches include the promotion of sound agricultural practices such as crop rotation, green manuring, alternative cultivation practices, small-scale mechanization, and weed and pest control.

98. The CGIAR system aims to harness modern science to the sustainable development of agriculture. In close coordination with national research facilities, the different centres of CGIAR are working for more resource-efficient technologies for food production while protecting and enhancing the natural resource base. Along the same lines, CGIAR has identified research areas, central to chapter 14 of Agenda 21, including the contribution of genetic improvement to disease and pest resistance; the increased use of nitrogen-fixing plants and reduced dependence on artificial fertilizers; the effectiveness of IPM research in reducing dependence on chemical pesticides; the potential of crop mulches to contain soil erosion; integrated agricultural resources management; and the application of improved agroforestry technologies. The different centres of CGIAR are taking on responsibilities for research and dissemination of results in these areas, as well as adopting an ecoregional approach to the development and transfer of sustainable agricultural technologies.

99. Nuclear techniques have increasing application in modern agricultural technologies that are supportive of SARD by enhancing productivity and permitting the replacement of conventional environmentally damaging techniques. Examples, drawn from the joint work of IAEA and FAO, include the use of radioisotopes for labelling deoxyribonucleic acid (DNA) in the manipulation of plant germplasm, and for studying the utilization of plant nutrients and the

fate of pesticides and other contaminants in the soil; the irradiation of food to replace chemical fumigants; and the production of sterile insect pests. The Agricultural Laboratory at Siebersdorf (Austria), a facility which is being expanded, is undertaking research, training and transfer of technology in this scientific area.

2. Major issues and challenges

100. Developing countries and, to some extent, economies in transition, face problems in evolving local-level indigenous technology, and in transferring clean technology from the developed countries, as well as in adopting and making efficient use of such technologies. Some farmers in these countries have been practising organic farming, traditional terracing, tillage and resource conservation methods for many years. However, the lack of farmers' capability to cope with the changes in the physical environment and the lack of understanding of these indigenous technologies and methods by those concerned in implementing government interventions have inhibited their development. At the same time, developed-country farmers can learn from the principles of such techniques, adapted to different agro-ecological and socio-economic conditions. As yet, there is no formal mechanism for such exchange.

101. Biotechniques are being increasingly used to create new, more productive strains of crop plants (transgenics in rice is a recent example), plant and animal diagnostic products, animal vaccines, biological pesticides and other biological control agents. However, their benefits are skewed towards the more developed countries - towards their farmers, crops and animals. The safety, cost and relevance of biotechnology should be assessed and compared with available traditional technological options. An international code of conduct on biotechnology developed by a multinational organization such as FAO would be a useful instrument in assessing biotechnology. Lack of international and national guidelines on the release of genetically modified organisms (GMOs) is also a major concern. Environmental impact assessments on GMOs need to be in place and biotechnology needs to be assessed for its impacts on poor and marginalized farmers.

102. Local innovation, development, transfer from outside and adoption of developed technologies require training for farmers and field educators. Education on improving fertilizer application methods and individual fertilization plans should be encouraged. As farmers also have experience of these technologies, their experience should be utilized. Other requirements are the developing of guidelines for legislators, extension advisers, and farmers on the best practical and the least harmful means of handling animal wastes. Likewise, the promotion of multispecies livestock production systems to increase waste and by-product recycling can lead to more efficient use of feed energy and nutrients.

103. Other major issues related to technological factors in developing countries are (a) information as well as misinformation, that is the amount and quality of information on technology, (b) efforts on developing participatory types of technology, (c) promoting traditional methods, technologies and knowledge, (d) basic scientific research, (e) financing technology transfer and

cooperation, and (f) disseminating lessons learned from past experiences. Developing countries should be helped not only by direct transfer of clean technologies suitable to their agro-ecological conditions but also by developing their own technology through local participation in order to develop their self-sustaining capacity.

IV. RECENT DEVELOPMENTS AND EXPERIENCES IN INTERNATIONAL COOPERATION

A. Intergovernmental cooperation

104. In Western Europe, the Economic Commission for Europe (ECE) adopted a decision on "Cooperation in the field of environment and sustainable development". The Commission also requested its subsidiary bodies to strengthen their activities in this field. An ECE workshop on Environmental Performance Review (EPR) in OECD countries in cooperation with OECD took place in May 1994. It stressed the need for close cooperation with other international organizations for the EPR process. The framework to be used for the EPRs includes the following elements related to agriculture: agricultural run-off as a source of water pollution; agricultural waste; landscape and habitat conservation; environment-related legislation; enforcement and compliance mechanisms; monitoring systems; environmental policy and integration with economic policies; land use planning; economic instruments; environmental considerations in the legislation on privatization; and land reform. OECD is also actively engaged in the analysis of the linkages between agriculture and the environment in the context of these policy reforms, and concerned with the need to promote sustainable agricultural practices with the least economic distortions.

105. In the countries of South Asia and the Pacific, the Economic and Social Commission for Asia and the Pacific (ESCAP) is carrying out a series of country studies, national seminars, regional meetings, and other technical assistance activities to promote sustainable agriculture.

106. In the countries of Western Asia, the Economic and Social Commission for Western Asia (ESCWA) is focusing its activities on resource conservation in some countries to assess the current status of resource degradation, prepare a sustainable land use plan, and analyse micro- and macro-policies and their linkages to sustainable resource use.

107. FAO, as one of the responsible United Nations organizations promoting SARD in the area of policy changes, is being requested by its member countries, both developing and those with economies in transition, to assist in reviewing existing policies and in formulating policies more consistent with SARD. In the past, FAO responded to such requests by (a) fielding missions and undertaking projects for policy analysis assistance and building capacity for policy analysis; and (b) taking actions to ensure that all policy assistance provided by FAO would take into account SARD objectives. FAO is also actively engaged in a number of areas where the concerns of agricultural trade and the environment meet. FAO's commodity and trade policy activities stress achieving growth and stability of international markets through producer/consumer consultations,

particularly through the Committee on Commodity Problems (CCP) and its Intergovernmental Groups. FAO is also helping countries develop their policies on environment and assisting them in their efforts to expand their agricultural trade in sustainable ways.

108. A concrete example of FAO's activities on environmental and trade issues is its work on strengthening the competitive position of natural vis-à-vis synthetic fibres, because of the greater environment-friendliness of the former. During the last two years, the Intergovernmental Group on Jute, Kenaf and Allied Fibres has been examining environmental issues having an impact on trade with respect to the products covered by the Group.

109. CCP also encouraged the Intergovernmental Groups to undertake commodity-by-commodity studies that would include (a) technical environmental reviews; (b) economic assessments of the costs of reducing environmental damage and of adopting SARD/environmental policies; and (c) national and international policy support to countries to adopt appropriate SARD/environmental policies. A methodology for economic assessment of commodity-specific environmental impact is under preparation, as well as case-studies on individual commodities.

110. The intergovernmental machinery of UNCTAD is also dealing with the issues related to SARD in different areas. Its Trade and Development Board is considering one specific topic related to trade and environment each year. In 1994 the specific topic was "The effects of internalization of external costs on sustainable development" and in 1995 it will be "The impact of environment-related policies on export competitiveness and market access". In 1993, the Standing Committee on Commodities discussed "Experiences concerning environmental effects of commodity production and processing" within the context of "fostering sustainable development in the commodity field". The agenda for its third session in September-October 1994 included "Identification of the means by which the competitiveness of natural products with environmental advantages is improved".

111. In the area of land conservation and rehabilitation, an important development since the United Nations Conference on Environment and Development has been the agreement reached in Paris, in June 1994, on a text for an International Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa (A/49/84/Add.2, annex, appendix II). This convention has four regional implementation annexes which provide for action in different regions.

112. At its 1993 Conference, FAO adopted a Special Action Programme for Land Conservation and Rehabilitation. This programme will continue to implement the existing International Scheme for the Conservation and Rehabilitation of African Lands (ISCRAL) and will also develop and help implement similar schemes for two other regions - Asia and the Pacific and Latin America and the Caribbean.

113. FAO is also taking active part in promoting IPM both in developed and in developing countries. In meetings of the FAO/UNEP Panel of Experts on IPM, of the International Agricultural Research Centres, and of the International IPM Working Group, and in other meetings organized by FAO and other international

organizations including the World Bank, UNDP and UNEP, ways to promote IPM have been discussed and priorities established.

114. Within the Special Action Programmes (SAP) formulated by FAO in response to the challenges posed by SARD, the two programmes on conservation, development and use of plant and animal genetic resources for agriculture are designed to promote in situ and ex situ conservation, evaluation, monitoring and use, and capacity-building for research and development in member countries. FAO is carrying out these activities in partnership with farmers, rural communities, national and international agricultural research institutions and non-governmental organizations. At the national level, FAO continues to support the establishment and/or strengthening of national capacities to conserve, manage and use genetic diversity, including crop diversification and the use of underutilized and multi-purpose species.

115. An early warning mechanism is also being developed to draw rapid attention to hazards threatening the operations of genebanks holding germplasm collections, and to the danger of the extinction of plant species and the loss of genetic diversity throughout the world. Progress has also been made in developing the global network through the renegotiating of an agreement between FAO and CGIAR on the location of CGIAR centre collections. There have also been contacts between FAO and national Governments on participation in the network. In India, FAO is advising an NGO on in situ conservation of PGR.

116. The Inter-American Institute for Cooperation on Agriculture (IICA) is collaborating with its member States in the design of policies, sectoral studies and institutional reforms, and in advisory services on sustainable agriculture. Also, IICA's strategy has focused on establishing new horizontal cooperation networks such as the Programa cooperativo de Investigación y Transferencia de Tecnología Agropecuaria para los Trópicos (PROCITROPICS) (or cooperative programme in land and cattle-related research and technology transfer for the tropics) which brings together eight countries of the Amazon basin and subregional networks on the subject of plant genetic resources management and conservation.

117. In the indo-gangetic region, an initiative has been taken among the countries of the region to strengthen their collaboration on research into the causes of the declining response to conventional inputs, and into new sustainable technologies suitable for the farmers of the region. The initiative was launched in January 1993 between senior agricultural administrators of Bangladesh, India, Nepal and Pakistan, together with the CGIAR centres - the International Rice Research Institute (IRRI), the International Centre for Maize and Wheat Improvement (CIMMYT) and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) - with the support of UNDP, the World Bank, the Asian Development Bank and various bilateral donor agencies. It is designed to facilitate this collaboration, as well as to provide guidance on policy and on a strategic research framework for addressing these issues.

118. In the area of rural energy, the World Bank is supporting the continued expansion of electricity distribution systems. Examples of Bank programme and project innovations in this area include:

(a) Extensive use of photovoltaic cells in poor/rural areas that would not otherwise be served by the national or regional power grid (especially for rural health clinics, village water pumping, battery charging for village use);

(b) In Estonia, a district heating rehabilitation project that, rather than rely on imported oil, supports the replacement of small boilers and their conversion to peat and wood;

(c) Programmes that encourage alternatives to biomass for fuel, such as the Calub Gas Development Project (Ethiopia), which is replacing wood fuels with liquefied petroleum gas in the south-eastern region of the country;

119. The Committee on New and Renewable Sources of Energy and on Energy for Development, at its first session, held in February 1994, noted with concern that, on the eve of the twenty-first century, 2.5 billion people in the developing countries still had little or no access to commercial energy supplies and electricity. 10/ The Committee recommended to the Economic and Social Council the adoption of a draft decision by which it would decide that the Committee should hold a session in February/March 1995 in order to provide advice on energy for rural development to the Commission on Sustainable Development at its third session, as provided for in Agenda 21. 11/ The recommendations of the Committee will be submitted to the Commission on Sustainable Development at its third session.

B. Cooperation within organizations of the United Nations system

120. Several cooperative activities have already been described elsewhere. Among United Nations organizations, FAO has initiated a number of actions such as (a) establishing a Special Action Programme for Country Policy Assistance for food security; (b) providing funding to support cross-sectoral activities within its Inter-Departmental Working Group for Environment and Sustainable Development and its specialized subgroups; (c) forming a new department of sustainable development which will provide more centralized leadership and greater visibility for this area of work when it is established in early 1995; (d) undertaking activities to improve the capacity of FAO and others to evaluate policies that integrate environment and sustainable development goals.

121. Among other coordinated efforts within United Nations organizations are (a) establishment of a working party on relations between agriculture and the environment in Europe in cooperation with ECE; (b) implementation of a farming-systems approach to development in Latin America, with support from other international agencies such as CGIAR, the World Bank, IICA, the International Cooperation Centre of Agricultural Research for Development (CIRAD)-SARD and national institutions; (c) implementation of an integrated approach to land and water management activities in cooperation with ESCWA; (d) activities on "Sustainable Agricultural Development Strategies" in Asia and Pacific countries in cooperation with ESCAP, UNDP and UNIDO; and (e) carrying out of research activities on sustainable farming systems in collaboration with CGIAR institutions.

C. Organizations outside the United Nations

122. The post-United Nations Conference on Environment and Development period has seen an increase in cooperation between non-governmental organizations and the United Nations family in the area of SARD. As the United Nations specialized technical organization in the field of agriculture, FAO has a special responsibility to develop such cooperation, in both policy formulation and field programmes. Non-governmental organizations are participating in a number of SARD-related normative activities, such as technical meetings related to the International Code of Conduct on the Distribution and Use of Pesticides and to the elaboration of standards for organic products within the FAO/WHO Codex Alimentarius. Non-governmental organizations are also well-established partners in FAO's efforts to promote the conservation and use of plant genetic resources, and will be closely associated with the preparations for the Fourth International Technical Conference on Plant Genetic Resources to be held in 1996. A consultation focusing on "NGOs and SARD in Asia: Challenges for Policies and Practises" was organized by FAO in September 1993, and non-governmental organizations have participated in the preparation of two issues on SARD in FAO's Development Education Exchange Papers (DEEP) Series: one issue on Latin America/Asia and the other on Africa/the North.

123. At the field level, FAO and non-governmental organizations in Africa, South Asia and Latin America have formulated regional components of a cooperation programme aimed at strengthening non-governmental organization capacity to promote sustainable farming systems and food security for peasant households, for which resources are being sought. FAO has drawn on the services of a Brazilian non-governmental organization, Assessoria e Servicos a Projetos em Agricultura Alternativa (AS-PTA), to assist a national peasant federation in Senegal (Fédération des organisations non gouvernementales sénégalaises (FONGS)) in promoting village-level reflection on the impact of structural adjustment on peasant agriculture and the environment. Field-level cooperation with non-governmental organizations is also an important part of the IPM programme in Asia and of the UNDP/FAO/UNIDO FARM programme in Asia.

V. CONCLUSIONS AND PROPOSAL FOR ACTION

A. Conclusions: has the path towards SARD been followed?

124. Apart from the lack of sufficiently comprehensive indicators, 12/ the reaching of definite conclusions about progress in implementing SARD following the United Nations Conference on Environment and Development is complicated by the fact that people have different perspectives of SARD shaped largely by the socio-economic environments in which they live. There is a corresponding diversity with respect to the sustainability of the agricultural and rural development path pursued, the nature of the environmental problems and the importance given to each specific programme area identified in chapter 14 of Agenda 21.

125. Environmental impacts in the agricultural sectors in OECD countries are rooted in increased production of agricultural commodities using more inputs, especially farm chemicals, with less labour and largely unchanged land area.

The environmental problems have been aggravated by agricultural policies - which have encouraged increasing production of some commodities on fragile lands and the use of inappropriate farm practices - and the lack of markets to value environmental public goods or the failures of some markets to internalize environmental costs and benefits within farmers' decision-making. The clear policy message is that agricultural policy reform (which has started to a limited extent in many OECD countries, and is underpinned by the recent Uruguay Round Agreement) is a necessary condition for tackling many of the environmental problems in agriculture. However, this reform will need to be supported by well-targeted policy approaches to addressing remaining environmental concerns in ways that are cost-effective from the point of view of domestic economic efficiency, government budgets, and administrative efficiency, and that also minimize international trade distortions. In the developing countries, the problems are related more to poverty and to lack of productive technologies. In the countries with economies in transition, the main difficulties to be confronted are weak institutions and poorly developed markets. They are also much concerned with industrial or "brown" environmental problems. Solutions will therefore be different although they will share common features: the need for coherent and transparent policy-making and appropriate legal measures at the national level, combined with strong political commitment; the widespread participation of those involved - the stakeholder - in the decision-making process; and finally, means to ensure that the process of globalization - of agricultural trade, capital flows and information - does not impact adversely on the environment and benefits small-scale farmers.

126. Disappointment is widely expressed at the lack of progress in moving towards SARD, even in the relatively short period since the United Nations Conference on Environment and Development. Yet the previous discussion shows that progress has been made although it has been uneven and, in some cases, not driven by a desire to implement SARD itself. Clearly much remains to be done in virtually all countries and the task has barely begun. It may be concluded, however, that perhaps there is now less need for broad advocacy of SARD, as represented by the Brundtland report, for example, and a much greater need for scientific implementation. This implies a need for more applied and strategic activity, in other words, problem-solving, research and information-sharing and more committed policy-making processes.

127. In the process of trying to gather together these thoughts trawled from a wide range of contributions to the present report, the following more specific conclusions emerged, leading to proposals for action:

(a) A productive agriculture is an essential prerequisite of SARD, with its multiple objectives of reducing poverty and improving livelihoods while conserving and protecting the natural resource base. At the same time, achieving SARD is a complex and slow-moving process, demanding patience, endurance and the willingness to exploit opportunities for stepwise advance over a wide range of quite confined activities, such as IPM, but within an overall strategy;

(b) Within the context of the situation of the majority of developing countries as well as the economies in transition, there needs to be an appropriate incentive environment that promotes, in particular, private sector

investment in agriculture and its supporting systems, and rewards environmental protection;

(c) In all countries, policies oriented towards promoting food and agricultural production and rural development and raising or maintaining farm incomes, while protecting the natural resource base, need to be coherent, consistent and mutually supportive;

(d) There is a need for a deeper and wider understanding of socio-gender-cultural-economic relationships between the farmer and his or her environment at the household and community levels and of the biophysical processes that underlie the interactions between farming activities and the ecologies in which they take place. Such understanding will improve the coherency and consistency of agricultural and environmental policies, improve the efficiency of measures to implement them and support the development of the appropriate indicators of sustainable agricultural activities needed to assess the status of a wide variety of ecologies in which farming takes place, and to monitor changes in status;

(e) The evidence from farms and communities from around the world shows that sustainable agriculture can be achieved in all three country typologies dealt with in this report, so as to bring both environmental and economic benefits to farmers, communities and nations. In this regard:

(i) In the industrialized agricultural systems, a transition to sustainable agriculture could mean a fall in per hectare yields of 10-20 per cent in the short term, but with better levels of financial returns to farmers;

(ii) In the high input and often irrigated lands of developing countries, farmers adopting regenerative technologies have maintained yields while substantially reducing inputs;

(iii) In the diverse, complex and "resource poor" lands of the third world, farmers adopting regenerative technologies have doubled or trebled crop yields, often with little or no use of external inputs, at least in the short term.

There is a need, however, for a better sharing of information, on both sustainable indigenous and modern technologies, to expand their use on a wider scale. This process will benefit from the moves towards increased networking and use of advanced information technologies;

(f) The above conclusions converge towards awareness of the need for a significantly greater emphasis on a wide range of agricultural research and information-sharing efforts. That agricultural research is currently underfunded constitutes a serious and potentially disastrous flaw in the global strategic approach to meeting future demands for food and agricultural products and to implementing SARD. There is a need to develop new agricultural technologies and better exploit existing technologies to permit the sustainable intensification of the more agriculturally productive areas, while enabling livelihoods to be protected in the more agriculturally marginal ones. In many

situations, though a range of information exists, that information must be more widely and equitably shared;

(g) Trade, and international food and agricultural trade in particular, has paradoxical features with regard to the environment and to the implementing of SARD. On the one hand, it offers opportunities to expand output beyond the demands of the domestic household, local and national markets and so creates employment, raises incomes and provides an incentive to invest in agriculture. On the other, in progressively eliminating the limitations on local or national markets, through the working of unfettered market forces, it can lead to the spoliation of natural resources. However, controlling the flows of trade for environmental reasons is generally not an efficient response and can lead to forms of environmental protectionism. It is better to tackle the problem of environmental damage at the source typically through the internalization of externalities, for example, by applying the polluter pays principle;

(h) Finally, reporting progress on achieving SARD, as well as making cross-country comparisons and identifying policy gaps, should be based on an agreed set of indicators. As mentioned, efforts for developing "sustainability" indicators are under way, but in rather fragmented ways. Such efforts should also proceed with improving the existing system of national accounts. Reorientation of data-collection and information management systems at the national levels, in each group of countries, would be an important component of such an initiative.

B. Proposals for action

1. Overall strategy

128. Chapter 14 of Agenda 21 provides a comprehensive plan of actions for implementing SARD, based on several distinct programme areas. Making SARD operational involves establishing the appropriate national policy environment at both agricultural and rural-related sectoral and macroeconomic levels within an internationally agreed framework of practices regarding trade and capital flows and treatment of property rights, setting up mechanisms to facilitate people's wide participation in decision-making, and moving ahead in several distinct yet interlinked technical areas such as land and water conservation and management, genetic resources, integrated pest management and plant nutrient systems, to name a few identified in the chapter. In these areas, the task is to obtain a better understanding of processes, sharpen concepts and approaches, fund field activities and learn from mistakes and successes.

129. The overall strategy should thus be towards focusing on the wider issues of institutional and policy changes that are needed to provide the right incentives and support mechanisms for the adoption of technology required to increase production efficiency, while promoting diversity, increase resilience and minimize environmental risks. With respect to national Governments, the message is a need for greater political commitment on their part to assuming responsibility for guiding progress towards SARD by making the required policy shifts and by reinforcing the participatory efforts of individuals, community organizations and non-governmental organizations.

130. All of these national-level actions have to be set within a broader political framework reflecting commitment to achieving largely socially related goals. These include reducing levels of poverty, integrating population factors with development and the environment, and empowering women so as to achieve greater gender equality. The move towards these goals will be effected through achieving more specific targets, such as universal primary education and health-care services, including reproductive health care, as set forth at a series of United Nations conferences. 13/

131. The message for the international community, including donor countries and multinational agencies, is to shape and support the undertaking of these measures through addressing the issues of development finance, international debt, trade and the environment, technology transfer and intellectual property rights and rewards for environmental stewardship. The overall message is to make a faster transition to the achieving of SARD.

2. Specific proposals for action

132. The proposals that follow are the result of the process of consultation between FAO as task manager and its partners, including non-governmental organizations, in preparing this report. They were presented in outline to the Council of FAO, at its one hundred and seventh session in November 1994, and the Council of FAO supported their submission to the Commission on Sustainable Development.

133. The proposals are to:

(a) Develop indicators for monitoring the status and trends of the various agricultural and non-agricultural dimensions of SARD objectives and guidelines for sustainable agricultural practices for a variety of ecological and socio-economic settings. There is a need to develop better statistical information and develop simple and low-cost indicators for monitoring SARD. Principles and guidelines are needed to assist countries in collecting and analysing information at the agro-ecological zone and/or the farming-system level to promote appropriate SARD policies. Development of information systems that analyse, in an integrated manner, the environmental, social and economic dimensions of SARD are under way in several organizations but are fragmented and lack visibility. This work should be accelerated and carried out in a more coordinated manner among agencies, non-governmental organizations and countries. Efforts should be made as soon as possible to collaborate with countries in developing the information base, identifying indicators and establishing SARD information systems;

(b) Review economy-wide and sectoral policies with regard to their compatibility with SARD objectives and use appropriate incentives and other measures to promote the adoption of sustainable agricultural practices and attain other SARD objectives. Some countries have already undertaken or are undertaking wide-ranging policy reviews as part of NEAPs and similar exercises. However, many countries have still not done so and often economy-wide and sectoral policies diverge widely in their focus and impact on SARD. The aims are to have a consistent and coherent policy framework within which to launch

programmes and projects fulfilling the broad objectives of SARD, tailored to the particular situations of different countries, and to increasingly internalize environmental externalities within market prices;

(c) Increase support to research and technology development for the sustainable intensification of agriculture, through the strengthening of national research institutions, the development of regional cooperative networks and the enhanced support of the CGIAR system. Agricultural research, particularly strategic, problem-solving research, has been consistently underfunded, although mechanisms exist for such funding such as CGIAR and its International Agricultural Research Centres, including the International Service for National Agricultural Research (ISNAR). The Commission on Sustainable Development may wish to support the recent initiative of the World Bank regarding CGIAR funding and recommend more consistent donor support in line with SARD objectives;

(d) Extend to a wider number of countries the ongoing FAO programmes and projects for sustainable land and water management in agriculture, IPM and integrated plant nutrition systems (IPNS), involving the collaboration of other institutions such as UNEP, the CGIAR centres, UNDP, the World Bank, and a range of non-governmental organizations. The strategy for implementing SARD consists of moving ahead in several well-defined programme areas. Some of these have been defined by FAO as Special Action Programmes which involve the collaboration of a variety of other institutions (United Nations bodies, non-governmental organizations, and so on), to develop approaches, formulate, fund and operate projects and distil experiences. The Commission on Sustainable Development may wish to draw attention to FAO's Integrated Cooperative Programme Framework for SARD (ICPF/SARD) and its component Special Action Programmes as a means of bringing together the initiatives of different development partners in a defined programme area with a view to implementing SARD;

(e) Strengthen national and international action for the conservation and sustainable use of animal genetic resources, thereby bringing international cooperation and support to a level similar to that of ongoing initiatives on plant genetic resources. There has been recent progress concerning the revision of the International Undertaking on Plant Genetic Resources for Agriculture so that it is in line with the Convention on Biological Diversity, the defining of the concept of farmers' rights and the launching of the preparatory process of the Fourth International Technical Conference on Plant Genetic Resources, to be held in 1996. Comparable international attention to and progress in the area of animal genetic resources have not been achieved, although a first world watch list of endangered species has been published. A global strategy for the conservation of animal genetic resources is being designed and the broadening of the mandate of the Commission on Plant Genetic Resources to include other forms of genetic resources is now under discussion. The Commission on Sustainable Development may wish to support these processes;

(f) Promote international cooperation and national action for sustainable and environmentally sound production and use of energy by rural communities and agro-industry. The challenge is to develop a strategy to facilitate and expedite the transition towards the sustainable use of an appropriate mix of

traditional, conventional and renewable sources of energy for rural communities and rural economic activities in a variety of socio-economic settings;

(g) Analyse the implications for SARD of the Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations 14/ at national, regional and international levels, through FAO collaboration with UNCTAD and the proposed Committee on Trade and Environment of the World Trade Organization. Concern is widespread that moves towards the liberalization of food and agricultural trade arising from the conclusion of the Uruguay Round of multilateral trade negotiations, while benefiting countries and farmers able to exploit the resulting market opportunities, may have adverse effects on the environment and on small-scale farming. There is also concern that environmental standards will be unilaterally lowered to maintain national competitiveness in food and agricultural markets. The aim of the analysis would be to assess such concerns, identify problems and recommend solutions;

(h) Ensure that SARD objectives are pursued with the full participation of rural people and their communities, and strengthen the capacities of local governments and private sector non-governmental organizations and rural people's organizations (farmers' organizations, cooperatives, rural workers' organizations, informal groups, community associations and so forth) in decision-making and the implementing of environmentally sound and socially just agricultural and rural development programmes. Participation involves democratization and the effective reduction of socio-cultural, economic and political constraints on the formation of local-level groups of a variety of types (comprising indigenous people, farmers, women, rural youth, and so on). Existing mechanisms to improve this process in rural areas need to be reviewed by all concerned organizations including FAO, the United Nations Development Fund for Women (UNIFEM) and UNDP, as well as national and local government agencies and non-governmental organizations. Such reviews should aim at enhancing existing mechanisms and identifying new ones, and may be part of the regular monitoring of the World Conference on Agrarian Reform and Rural Development (WCARRD) Programme of Action, 15/ and of People's Participation in Rural Development: the FAO Plan of Action. 16/

134. Should the above proposals for action be endorsed by the Commission on Sustainable Development, the cooperative mechanisms established by the task manager for preparing this report, could also serve as a means for their implementation within a collaborative framework. The basis for such collaboration would be the institutional comparative advantage of the various partners.

Notes

1/ Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992, vol. I, Resolutions Adopted by the Conference (United Nations publication, Sales No. E.93.I.8 and corrigendum), resolution 1, annex II.

2/ Rome, FAO, 1987 (C 87/27, July 1987).

3/ Oxford and New York, Oxford University Press, 1987.

4/ FAO Council, Report on FAO/Netherlands Conference on Agriculture and the Environment (Rome, FAO, May 1991), appendix A, first part, sect. II (1).

5/ Rome, FAO, 1993 (C 93/24, November 1993).

6/ AT 2010 projects a positive (that is to say, the most likely) scenario rather than a normative (desirable) one.

7/ See United Nations Environment Programme, Convention on Biological Diversity (Environmental Law and Institutions Programme Activity Centre), June 1992.

8/ United Nations Environment Programme, 1987.

9/ Rome, FAO, 1986 (M/R8130/E/5.86/1/3000).

10/ See Official Records of the Economic and Social Council, 1994, Supplement No. 5 (E/1994/25 and Corr.1), para. 4.

11/ Ibid., chap. I, sect. B, draft decision I.

12/ Various bodies, such as the Department for Policy Coordination and Sustainable Development of the United Nations Secretariat, FAO, the Statistical Division of the United Nations Secretariat, UNEP, WHO, OECD and some non-governmental organizations, are working on a series of sustainability indicators, including those for chapter 14 of Agenda 21, but they are only at a preliminary stage.

13/ Recent conferences include the United Nations Conference on Environment and Development and the International Conference on Nutrition, both held in 1992, and the International Conference on Population and Development (1994). Of course, these targets stretch back to the World Food Conference (1974) and the World Conference on Agrarian Reform and Rural Development (1979).

14/ Legal Instruments Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, done at Marrakesh on 15 April 1994, vol. I.

15/ See Report of the World Conference on Agrarian Reform and Rural Development, Rome, 12-20 July 1979 (WCARRD/REP); transmitted to members of the General Assembly by a note of the Secretary-General (A/34/485).

16/ Rome, FAO, 1992.